REMARKS

Claims 1-14 were examined and reported in the Office Action. Claims 1 and 5-14 are rejected. Claims 2-4 are objected to. Claims 2, 3, 5, 10 and 12-14 have been amended. Claim 1 has been cancelled. Claims 2-14 remain.

Applicant requests reconsideration of the application in view of the following remarks.

It is asserted in the Office Action that Claim 13 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement, the Examiner noting, Claim 13, in particular, contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. In particular, the Examiner objected to the language ". . . a heater power supply which decreases the voltage to be applied to said heater as an electric current flowing through said anode increases." In response, Applicant notes the following. The "heater power supply" recited in Claim 13 is described in the specification on page 17, line 17 to page 18, line 2. At the time this application was filed, the specifics of a suitable heater power supply was already known at the time this application was filed.

In support thereof, attached herewith is a document relevant to this teaching (heater power supply 31). This document is a part of an instruction manual of Magnetron "YJ1600" manufactured by PHILIPS Electronics. It shows, in Fig. A5, a filament voltage control circuit corresponding to the relevant teaching in the specification of the present application. Please refer to the Item "Filament voltage control" on page 5 of the manual where a circuit configuration and operation therefore is described with reference to Fig. A5. Please also see Fig. 4 along with its associated description on page

3. Although the publication date is unknown, it has a fax date of June 9, 1986, so it clearly forms part of the prior art.

In view of the foregoing, reconsideration and withdrawal of the rejection under 35 USC 112, first paragraph is requested.

It is asserted in the Office Action that Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Donal, Jr. (US Patent 2,820,197) in view of Kline (US Patent 2,949,581). Claims 5-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Donal in view of Kline further in view of Nyswander (US Patent 6,914,556). Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Donal in view of Kline further in view of Tomoyasu et al. (US Patent 6,544,380). Claims 2-4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response, Applicant has cancelled Claim 1. Claim 2 and Claim 3 have been amended in independent form which include all of the limitations of cancelled Claim 1. Additionally, Claims 5, 10 and 12-14 have been amended to directly depend from currently amended independent claim 2 or 3 respectively.

Accordingly, reconsideration and withdrawal of the above rejections is respectively requested.

In view of the foregoing, it is submitted that claims 2-14 patentably define the subject invention over the cited references of record, and are in condition for allowance and such action is earnestly solicited at the earliest possible date. If the Examiner believes a telephone conference would be useful in moving the case forward, he is encouraged to contact the undersigned at (310) 207-3800.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR, & ZAFMAN LLP

Dated: 12/11/08

By: ______________________

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CERTIFICATE OF MAILING:

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______________________ 12-11-08

Linda Metz Date:

Electronic
components
and materials

PHILIPS

YJ1600 magnetron for microwave heating up to 6 kW

In a working magnetron, not all the electrons contribute to the generation of microwave power. After their energy has been increased by the r.f. field, some electrons return to the cathode, striking it with a kinetic energy high enough to increase its surface temperature considerably. This effect, known as back-bombardment, depends on the mean anode current of the magnetron. To maintain an acceptable cathode temperature, the filament voltage of the YJ1600 must be reduced in accordance with Fig. 4 as the anode current increases.

Fig. 4)

CONSTANT INPUT POWER STABILIZATION

The output power of a microwave generator using the YJ1600 can be influenced by:

- mains voltage variations (see Fig. 3)
- an increase in temperature of the ferrite magnets. This weakens the magnetic field, lowering the anode voltage
- changes in the r.f. load which alter the anode voltage at a given anode current. For example, starting from the typical load condition of a v.s.w.r. of 2,5 in the sink phase (see Fig. 2) and shifting to the anti-sink region causes the anode voltage to decrease.

Because the efficiency of the YJ1600 is virtually constant for a fixed load under all operating conditions, to stabilize the output power it's only necessary to stabilize the input power. Constant-input-power stabilization is suitable for most microwave generators using the YJ1600. However, for a varying load, the efficiency of the magnetron will vary depending on the operating point on the Rieke diagram.

Mains voltage variations

At the operating point P_1 in Fig. 3, the output power is 5 kW at nominal mains voltage and a coil current of -1,7 A. With no stabilization, if the mains voltage falls by 10% say, the operating point moves to P_3, corresponding to an output power of less than 0,5 kW. To keep the output power at 5 kW for a 10% fall in mains voltage, the desired operating point is P4, which can be reached by increasing the coil current to -3,6 A. At P4, the input power V_aI_a is the same as that at P1, namely 6,83 kW, and because the efficiency of the magnetron is virtually constant between P1 and P4, the output power is stabilized.

Influence of magnet temperature and r.f. load

The coil current can also be used to stabilize the input power when the anode voltage is lowered, for example, by an increase in temperature of the permanent magnets, or a change in the r.f. load. In each case, increasing I_m (i.e. making it more positive) keeps the input power constant.

For effective control over a wide range of operating conditions, I_m should be about -1,7 A at full power and nominal mains voltage.

POWER SUPPLIES

Two supplies for continuous control of the output power over the full operating range of the YJ1600 are described in the Appendix of this publication. Each supply uses constant-input-power stabilization. The first circuit is the simpler of the two, using an approximation of the input power to control the supply; in the second, the exact value of input power is used.

Fig. 5/6)

MECHANICAL DATA

Figure 5 shows the dimensions of the YJ1600. Figure 6 shows the measuring probe 55386.

The power amplifier has a complementary output stage for 'positive' and 'negative' energization of the electromagnet, allowing a small coil to be used. For a symmetrical output drive, set the input to 0 V and adjust potentiometer R1 (Fig. A4) until the collector voltage of TR1 is -12 V. Adjust R2 until the output of the amplifier is 0 V. With input voltages of -5 V and +5 V, check the symmetry of the output signal and, if necessary, adjust R1 again.

<u>Switch and switch controller</u>
Between the adder and the comparator is a double-pole double-throw switch (U1a to U1d) used to activate power control when the anode voltage exceeds a set level. During warm-up, the switch U1c and U1d is open (U1a and U1b closed) and the coil current is a maximum, producing maximum 'positive' magnetic field in the resonator, corresponding to virtually zero output power. After warm-up, the switch U1c and U1d is closed (U1a and U1b opened), the magnetic field decreases slowly, and the output power rises smoothly to a stabilized value.

The switch is controlled by transistor TR1 and the Schmitt trigger inverters U2a and U2f. When the supply voltage is not sufficiently negative, TR1 is turned on by the output of the anode voltage detector, producing a logic LOW at the input of U2a. The HIGH output of U2a closes the switch U1a and U1b. C3 is connected via U1a to the voltage tap of the divider R18 and R19. The input of the comparator is connected via U1b to R20, so the electromagnet produces maximum magnetic field, resulting in minimum output power.

After warm-up and when the output of the anode voltage detector is sufficient to turn TR1 off, the output of U2a goes LOW, closing the switch U1c and U1d (opening U1a and U1b). C3 which is connected to the output of the adder A2b via U1c and R17 slowly discharges to the output voltage of the adder. Because this signal is also connected to the comparator A3, the magnetron can start oscillating and the output power increases to the preset value.

<u>Filament voltage control</u>
It was stated in the main text that when the anode current increases, the filament voltage should be reduced to prevent overheating the cathode. During warm-up with no anode voltage applied, the filament voltage should be 5,0 V at nominal mains voltage. During operation, the filament voltage should be reduced to 4 V and thereafter controlled between 0 V and 4 V depending on the anode current.

Fig. A5)

Figure A5 shows a typical filament voltage control circuit. A signal proportional to the magnetron current is amplified and photocoupled to the input of a TCA280A used to control a triac which regulates the filament voltage according to the derating curve (Fig. 4, main text).

During warm-up, before the anode voltage is applied, the control circuit is by-passed and the triac is shunted by a switch.

The maximum and minimum filament voltages are set with the anode voltage off, and with the switch S1 (Fig. A5) opened manually to activate the triac.

To set the maximum filament voltage, set the input signal to zero and adjust R3 for a filament voltage V_f of 4,0 V measured at the magnetron.

To set the minimum filament voltage, set a current of 950 mA through Ra and adjust R1 for a filament voltage V_f of 0,5 V.

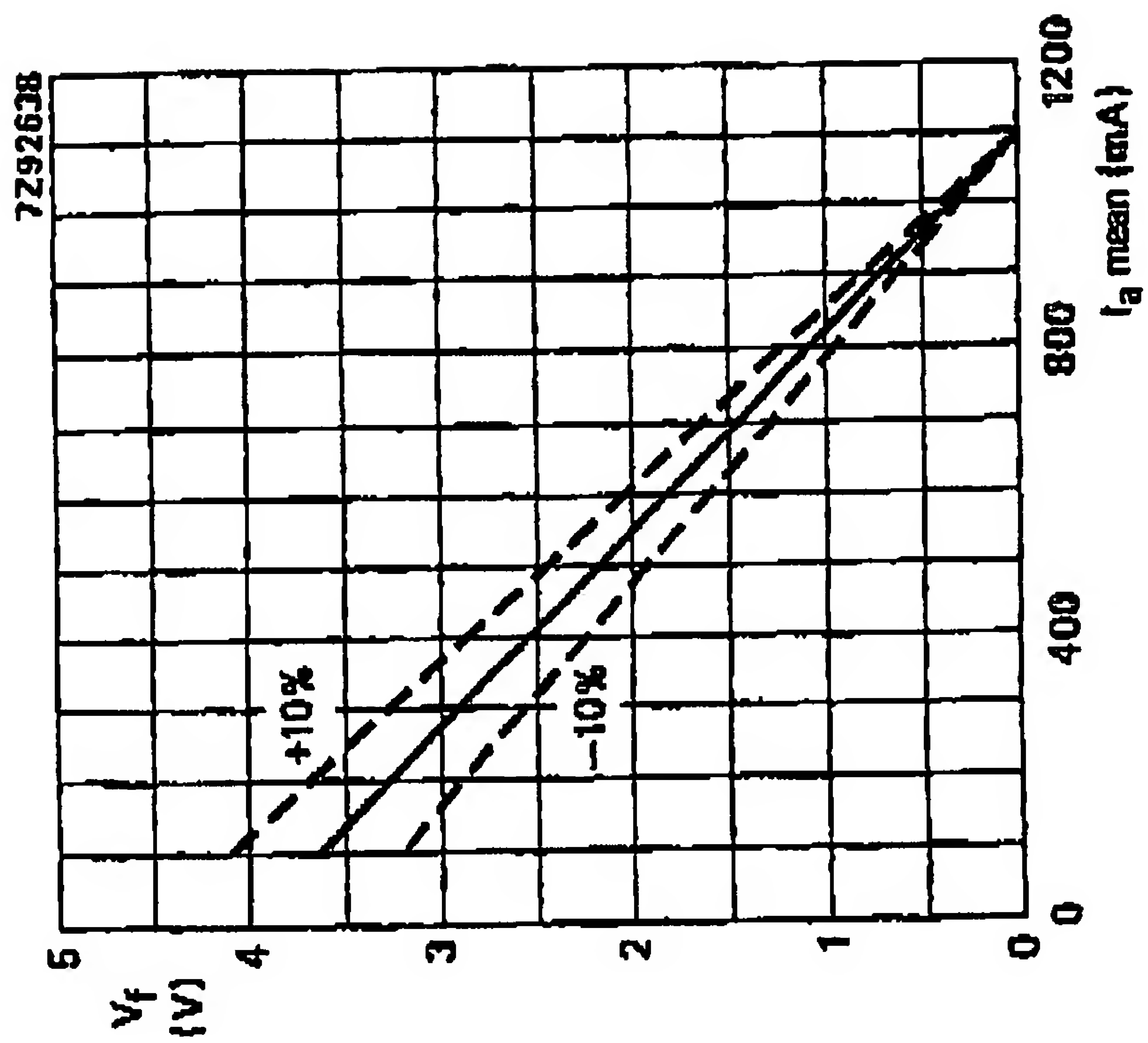
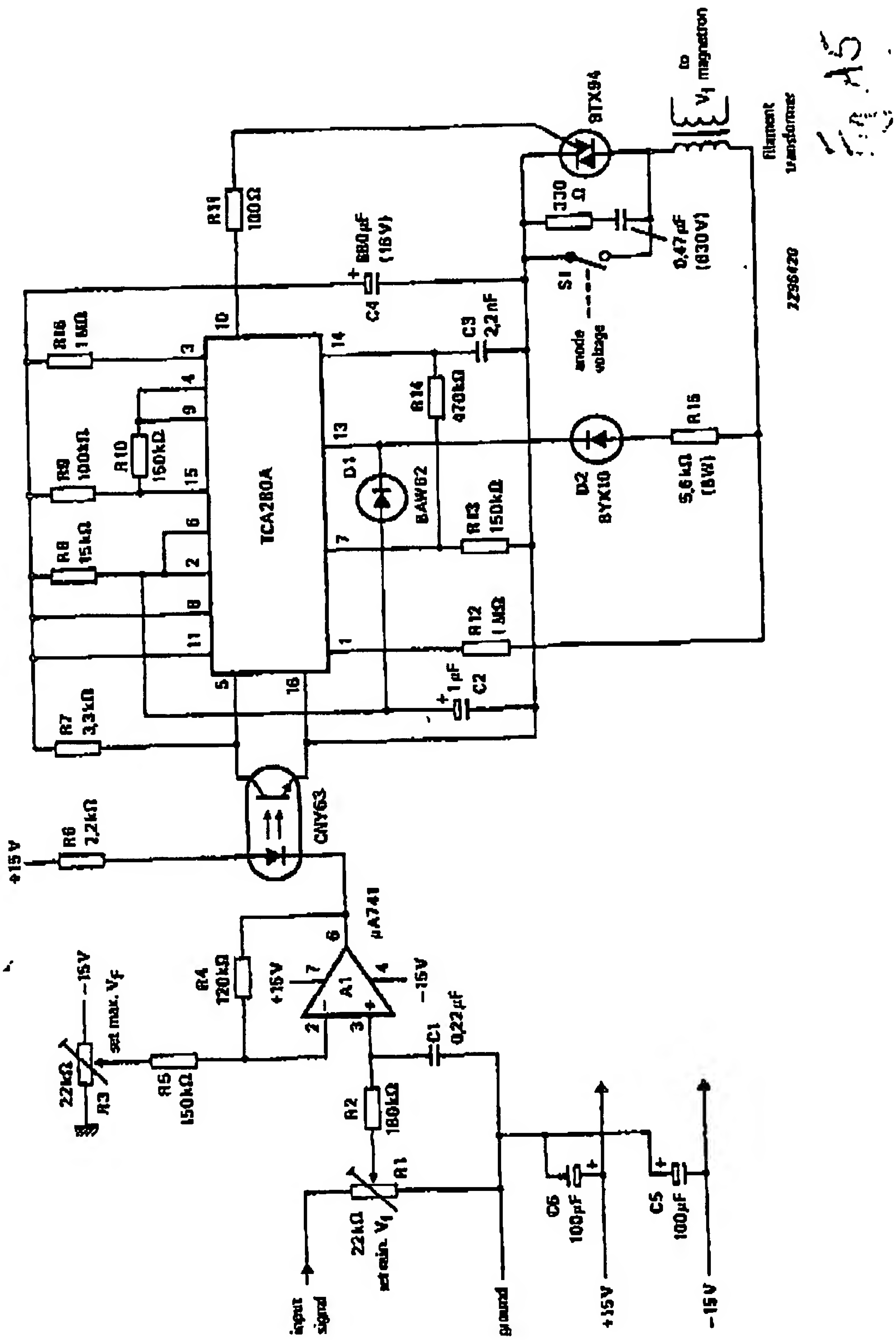


Fig. 4

YJ1600

12 x 10



BTX94
to magnetron
V_1
filament transformer
330 Ω
0,47 µF (630 V)
S1
anode voltage
R11 100Ω
C4 680 µF (16 V)
C3 2,2 nF
R16 1 MΩ
R14 470 kΩ
R15 5,6 kΩ (8 W)
D2 BYX10
R9 100 kΩ
R10 150 kΩ
TCA280A
D1 BAW62
R13 150 kΩ
R8 15 kΩ
R12 1 MΩ
C2 1 µF
R7 3,3 kΩ
CNY63
R6 2,2 kΩ
+15 V
µA741
A1
R4 120 kΩ
−15 V
set max. V_F
22 kΩ
R3
R5 150 kΩ
C1 0,22 µF
R2 180 kΩ
R1
22 kΩ
set min. V_1
input signal
ground
C6 100 µF
C5 100 µF
+15 V
−15 V
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